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## FOREST PLANTING LEAFLET.

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### TAMARACK (*Larix laricina*).

#### FORM AND SIZE.

The tamarack is a straight, slender tree, averaging about 60 feet in height and 15 to 20 inches in diameter. It rarely attains a height greater than 80 feet or a diameter of more than 30 inches. When grown in the forest the tamarack has a clean straight bole and a narrow pyramidal head. In the open this regular form is lost and the crown becomes broken and spreading.

#### RANGE.

The tamarack has the widest range of all the conifers of the Northeast. It has its approximate southern limit in northern Pennsylvania, Indiana, and Illinois, and extends northward to the Arctic Circle and westward in the United States to central Minnesota.

The tamarack is most plentiful in the swamps and silted lake beds of northern regions, where it occurs in dense pure stands or mixed with arborvitæ and black spruce over vast areas. The best specimens grow where the moisture is not excessive, on the edges of swamps and along the banks of sluggish streams, in mixture with balsam fir, black spruce, black ash, and arborvitæ. Other natural associates are the birches, red maple, sugar maple, tupelo, and occasionally white pine. Although more common on lowlands, in places it grows on mountain sides up to an elevation of 4,000 feet. It may be planted in suitable situations throughout the Northern States from the Atlantic to the Mississippi.

#### HABITS AND GROWTH.

Few trees can endure such variable moisture conditions, but despite the ability to live on either wet or dry soils the form of growth is greatly influenced by the site. By far the better trees are found on the rich light soils of the upland, though they occur in greater abundance on wetter, stiffer soils, where competition with the spruces and other

species is not so keen. In swamps where standing water covers the roots and excludes the air from them, the tree little more than maintains its existence. The tamarack will not endure drought, however, and the soil best adapted to it is rich, moist, alluvial loam, such as occurs along the banks of streams and on the borders of lakes and marshes.

The tamarack is very intolerant, and to maintain itself must outstrip its competitors in height growth. In plantations, when mixed with other trees, it should always form the upper story.

In the Northeastern States the rate of growth of this species is more rapid than near the southern limits of its range. Under favorable conditions the tamarack will grow to a height of 45 feet in thirty years, and at forty-five years after planting should be about 60 feet in height with a diameter of at least 18 inches.

In addition to more rapid height growth the tamarack has a slight advantage over coniferous associates in that its foliage is deciduous. The returning of the leaves to the ground each year tends to improve the site.

About twenty-five years ago much of the mature tamarack of the Northeast was killed by the larvæ of a sawfly. The ravages then ceased and a large quantity of second growth replaced the original stands. In 1901, however, this sawfly reappeared and did serious injury to the young trees of the Adirondacks. Tamarack is often attacked, in very wet situations, by a fungus which so honeycombs the wood that the tree is blown down.

#### ECONOMIC USES.

The wood resembles red pine, but is somewhat stronger and stiffer. It is fairly hard, resinous, rather coarse-grained, but checks readily. It is very durable in contact with the soil. It is used in shipbuilding and for fence posts, ties, telegraph and telephone poles, and in the manufacture of canoes. The tall slender boles of the mature trees make excellent spars and masts, and have been extensively used for that purpose.

Lumbermen recognize two varieties of tamarack, the red and the white, the distinction being based on the color of the heartwood. The red-hearted trees have less sapwood and are produced on colder, less favorable soils than the white tamarack.

The roots that are developed in the deep mud of the northern swamps are very long, tough, and stringy. They were once used by the Indians for withes. On drier land strong knees are sometimes developed by a large root starting downward and then taking a lateral direction. Such knees are of value in shipbuilding.

No large commercial plantations of the tamarack are known to exist, and its use has thus far been limited to ornamental planting. The tree

is well worth a trial, and plantations of the tamarack, either in pure stands, or, better, in mixture with other species, should prove profitable in many localities. It can not be expected, however, to thrive on sites where no other merchantable species will, and the planting of tamarack for profit on swampy land is quite impracticable.

#### METHODS OF PROPAGATION.

Tamarack is reproduced by seeds. Young tamarack requires sunlight, so that natural reproduction is confined chiefly to open fields and the borders of swamps and marshes. If in cutting over a tamarack swamp a few seed trees are left, the stand will usually reproduce itself.

Nursery-grown trees are best for forest planting. When stock is purchased from nurserymen the substitution of forest-pulled seedlings for those grown in the nursery should be guarded against.

The seeds are borne annually in small upright cones which fall during the second year. The seeds are about one-eighth inch long, pale, winged, and are produced in abundance at intervals of from two to six years.

It is easy to grow tamarack from seed. The cones should be collected during September, when they mature, and stored in a dry cool place until the seed is needed for planting. They should then be spread in the sun until the scales open sufficiently to allow the seeds to drop out.

In raising plants of this species the general direction for the growing of conifers given in "How to Grow Young Trees for Forest Planting" should be followed. This article is published as Extract 376 from the Yearbook of the Department of Agriculture for 1905. The seed should be sown in the spring in carefully prepared beds and dropped so thickly in the drills that they touch one another. If fresh, about 50 to 75 per cent of the seed should germinate.

The seedlings grow slowly and require partial shade during the first season. At the end of one year they will be only 2 to 3 inches high, but will increase in height rapidly during the second season. At the age of two years they may be transplanted to nursery rows or to the permanent site. Since the root system of the tamarack is shallow, with the form of a broad, very compact mat, the young trees are easily planted.

#### PLANTING.

The plants may be set out when two or three years old. Transplanting must be done very early in the spring, because the buds of the tamarack start while other conifers are still dormant. The trees should be set 6 feet apart each way.

Tamarack may be grown in pure stands, but mixtures are advisable with such species as balsam fir or spruce. When used for ornamental purposes the tamarack should never be planted singly nor in exposed places, for the branches are easily broken by wind and snow, and exposure usually results in stunted or poorly formed trees.

#### CULTIVATION AND CARE.

The tamarack will rarely be planted where cultivation is possible and the plantation will therefore require little care other than protection from fire and stock. Trees of this species should not be allowed to become overtopped by their associates and deprived of light.

In case of serious attack by the sawfly or other insects, specimens should be sent to the Bureau of Entomology of the Department of Agriculture for identification and suggestions as to control. Extensive injuries from fungi should be reported to the Bureau of Plant Industry of the same Department.

Approved:

JAMES WILSON,

*Secretary of Agriculture.*

WASHINGTON, D. C., *July 15, 1909.*

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